

ABSTRACT OF THE DISCLOSURE

A bi-directional transient voltage suppression ("TVS") device (101) includes a
5 semiconductor die (201) that has a first avalanche diode (103) in series with a first
rectifier diode (104) connected cathode to cathode, electrically coupled in an anti-
parallel configuration with a second avalanche diode (105) in series with a second
rectifier diode (106) also connected cathode to cathode. All the diodes of the TVS
device are on a single semiconductor substrate (301). The die has a low resistivity
10 buried diffused layer (303) having a first conductivity type disposed between a
semiconductor substrate (301) having the opposite conductivity type and a high
resistivity epitaxial layer (305) having the first conductivity type. The buried diffused
layer shunts most of a transient current away from a portion of the epitaxial layer
between the first avalanche diode and the first rectifier diode, thereby reducing the
15 clamping voltage relative to the breakdown voltage. The TVS device is packaged as a
flip chip (202) that has four solder bump pads (211-214). The abstract is submitted
with the understanding that it will not be used to interpret or limit the scope or
meaning of the claims pursuant to 37 C.F.R. §1.72(b).